

DECEMBER APES NEWSLETTER

Hello!! I am so sorry that this is delayed yet again. I have been experiencing some burn out this year and needed to step away for anything extra. I appreciate you being patient with me.

Please enjoy the following newsletter - as always if you have questions or comments feel free to reply to this email or reach out at kshapiro86@gmail.com

The December newsletter will have several times below - they include:

- I. [CER](#)
- II. [Unit 6 Resources](#)

I. CER



CER is an acronym heavily utilized in NGSS that stands for Claim-Evidence-Reasoning, which may be used to help students break down and understand how to write about scientific data they are presented with. You can read a little bit about [CER here](#). Paul Anderson of Bozeman Science presents this well in [his video](#) and has quite a bit about [CER on his website](#). I find that [his graphic organizer](#) is very useful in helping scaffold CER for my students, especially in the beginning. I begin to introduce CER with my freshman biology students, however it is something I continually have to go over with APES kiddos (grades 11/12). [This article discusses ways to introduce CER](#). [This was an assignment](#) that I used in 2020 during remote work, but have also used it in class to introduce CER. [This CER introduction](#) incorporates a bit

of SEL into the introduction and I find it a great second or third day activity. It was assembled by the wonderful Winnie Litten Sloan of AP Biology.

C stands for claim - or a statement that can be made about the data (the trend is increasing, there is an inverse relationship, the pollution levels peaked in XYZ year).

E stands for evidence - this is the qualitative or quantitative data to support the statement above. I sometimes find that it is easier for my students to write the evidence portion first, then the claim. They will often make a claim they think responds to the research question, but then don't always have the evidence to support it, so by writing the evidence first, they can make an appropriate claim afterward.

R stands for reasoning - or the scientific justification behind the evidence. For example, because of the Clean Air Act that removed lead from gasoline, atmospheric levels fell. Another reasoning might be: Dissolved oxygen levels declined because aerobic bacteria were consuming the algae that bloomed because of fertilizer runoff. Because the bacteria require oxygen to do decomposition, the oxygen levels in the water declined. This should bring their explanation full circle.

Task Verbs Used in Free-Response Questions

The following **task verbs** are commonly used in the free-response questions:

Calculate: Perform mathematical steps to arrive at a final answer, including algebraic expressions, properly substituted numbers, and correct labeling of units. Showing work is required.

Describe: Provide the relevant characteristics of a specified topic.

Explain: Provide information about how or why a relationship, process, pattern, position, situation, or outcome occurs, using evidence and/or reasoning to support or qualify a claim. Explain "how" typically requires analyzing the relationship, process, pattern, position, situation, or outcome; whereas, explain "why" typically requires analysis of motivations or reasons for the relationship, process, pattern, position, situation, or outcome. Also phrased as "give one reason."

Identify: Indicate or provide information about a specified topic, without elaboration or explanation.

Justify: Provide evidence to support, qualify, or defend a claim and/or provide reasoning to explain how that evidence supports or qualifies the claim.

Make a claim: Make an assertion that is based on evidence or knowledge.

Propose a solution: Provide a proposed solution to a problem based on evidence or knowledge.

We can see that CER is somewhat mirrored in the task verbs found on [page 227 of the CED](#).

You can see [various examples of CER in the FRQ's of APES](#) in this document, as well as acceptable and not acceptable answers.

A note about CER in APES FRQ writing - the claim and the evidence will almost always come together. Students should be trained that Make a claim should include evidence when writing on the FRQ. I advise students to always include specific numbers from the data set. They can use a spare pencil on the side of the booklet to draw a line to either axis to determine a specific data point.

The "R" of CER is seen in the justify trigger verb. This is most often seen in science practice 7 - evaluate an environmental problem or solution.

While CER is an easy format for kids to follow and remember, training them that on the FRQ - CE must go together and reasoning is the same as justify is very important.

II. Unit 6 Resources

Unit 6 is my least favorite unit. It just is kind of boring to me and I'm like eh... so my resources aren't going to be stellar for this one. Here is [my calendar for this year](#), and the [one from last year](#) because the one from this year isn't very good.

I do know that Kristi Schertz has a [unit 6 calendar](#) if you need additional inspiration.

Some additional resources include:

- a. Kilowatt meter lab; there is one on kristi's site above, and I always find a ton by just googling.
- b. [SWITCH](#) - this is an AMAZING resource. I have shown the clips in stations (worksheet can be found in the FB google drive), the full movie, and the new movie - SWITCH ON, which is about renewables. I don't really think there is a right or wrong way to do this, just really depends on you and your students.
- c. These [hero trading cards](#) created by Alyson Wasko for renewable resources - I would provide some time in school for these, some time at home. Then depending on your number of students, you could make copies and have students trade cards. Giving student ownership over other people's learning can be powerfully motivating - maybe couple this with my [justification](#) sheet to have students evaluate if the resource "hero" is truly a hero. This helps hit science practice 7.
- d. I've also done the shark tank videos that are in the facebook drive for renewable resources. My kids loved that!
- e. There is a pbl from [Sprocket](#) about energy conservation and use. It may need some work on your part, but can be very powerful if done correctly.
- f. If you have money, I LOVE these [vernier kid wind kits](#). You need some additional supplies, such as this [energy sensor](#) and the program (but many schools already have this) and the kids LOVED it. I needed one kit for every 3-4 students, so it is kind of pricey in the beginning, but we just had the students bring in materials (copy boxes, pizza boxes, cardstock) in the following years, and it didn't cost much.
- g. [NEED energy curriculum](#) - This has a variety of curriculum resources that I have always found very helpful.
- h. I cover 6.2 by having students explore and then [find graphs about consumption and conservation](#), various renewable and non-renewable resources from this website. Students then jigsaw their CER.
- i. Students MUST know how electricity is created from an energy source - [these visuals can be helpful](#). Students don't need to know how a generator works, but must understand that the turbine spins for various reasons (tidal, wind, hydro, steam from combustion of fossil fuels), which is attached to a generator, which converts the mechanical energy into electrical energy. THIS IS CONSISTENTLY ON THE EXAM in either the multiple choice or the [FRQ - see the 2021 hydroelectric dam question for an example](#).

- j. Students must understand the advantages and disadvantages of the four non-renewables, including specifics about nuclear waste, and the listed renewables in the CED: (biomass, solar, wind, hydroelectric, geothermal, hydrogen fuel cell).
 - i. [There is an excellent bioethanol lab from carolina that I am excited to try out after the AP exam \(I didn't order in time\).](#) If you have money, carolina has a few other lab kits that may be useful.
- k. The AP exam LOVES to ask about the advantages and disadvantages of dams. I have always shown the documentary DamNation and [this snapshot](#). It is found on netflix or for \$2 on youtube or amazon prime.
- l. Debates can be particularly powerful in this unit and [this site](#) helps show both sides of the issue and is unbiased.
- m. [This website was shared in the FB group last week and I plan on making some time to explore it.](#)
- n. If you are on the handy side, the great APES teacher Benjy Wood used to do a lab that had students create dams with modeling clay and then utilized pieces of gutter to model how soil can build up behind dams and the impact it has on [coastlines as seen in this FRQ](#). The lab was floating around at one point, so if you have it - DO IT! I can't share due to copyright, but it is one of my favorites.
- o. Within nuclear, I often broke students into 6 groups and had two groups each working on: Fukushima, Chernobyl, and Three mile island. They had to create a chart that compared the environmental, economic, and human health impact of each disaster. Then then jigsawed and shared out to complete.

Anywho - that is all I got. Sorry its kinda draw and not as flashy - but like I said - MY LEAST favorite unit.

Throughout the unit we do LOTS of math practice. Most of my warm ups throughout the unit are just the math practice FRQ's that have to do with energy - [I use this list to help find them. or sort in the AP Classroom question bank.](#) Credit to Dr. Mark Ewoldsen for the list.

I hope that this is helpful to you! As always please reach out with questions or comments!

Kristin Shapiro. Florence Jr Sr High School. Florence. Co

schoolofshap.com